

## WP4 Hunting, sustainable harvesting and consequences for biodiversity

### Key message

Research on the impact of hunting on biodiversity has shown that hunting (and its associated management) can be a strong driver in conserving biodiversity, because many of the objectives in hunting (maintaining healthy populations, preserving natural habitats, reducing limiting factors for game) are shared with those of wildlife management and conservation at large. However, sometimes hunting has negative consequences on biodiversity, usually because of certain management activities performed in unsustainable ways, and these are maintained because of economic or cultural reasons. Additionally, hunting may benefit certain species, but not others, and the overall benefit of hunting for biodiversity and conservation will depend on the relative value that is attached to different animal guilds or species in different contexts. Overall, our research indicates that hunting estates that have benefits for biodiversity should be identified and favoured over those that are not.



## 4.2 Social-ecological modelling for improved sustainability of hunting

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### Messages from the case studies

#### Theoretical modelling framework

WA simulation model combining fisheries management approaches with household utility theory and two literature reviews identified that individual decision making affects the dynamics of natural resource use systems and its sustainability. It is thus crucial for the success of conservation to understand and take into account incentives of resource users to make recommendations for conservation.

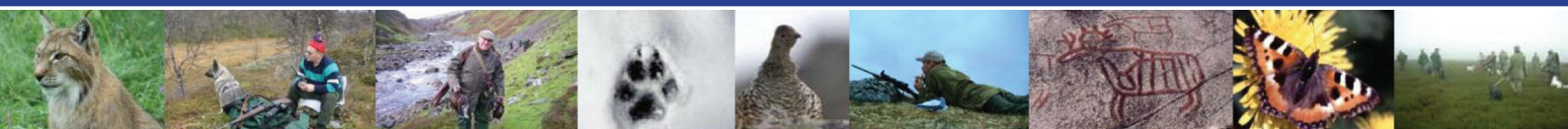
#### Bears in Croatia/Slovenia

People respond to changes in the management of wildlife with changes in their attitudes towards these species, especially if they are hunted and cause conflicts; a more centralised bear management led to more support for limiting bear numbers but overall attitudes remained positive due to the bear's cultural importance, and associated use and bequest values<sup>8</sup>. Economic analysis of stakeholders for the same case study shows that

joining the EU in 2013, which will stop trophy hunting, will result in economic losses for bear managers. This suggests that hunting will not be economically viable and this might lead to lower compliance and thus higher poaching rates. The change from a hunted to a protected bear population might threaten a so far socially and ecologically sustainable hunting system.

In an MSc thesis, we revisited the habitat selection of brown bears in Slovenia and Croatia in relation to natural and human dominated features in the landscape. Proximity to supplemental feeding stations and availability of large forest patches (> 5000 hectares) were the best predictors of brown bear habitat selection. Feeding stations are shared with red deer, another important species for hunting, but the future of these feeding stations is uncertain without income from brown bear trophy hunting. Without feeding stations, brown bear might roam more widely which might increase levels of conflicts with local people.

**HUNT is an interdisciplinary international research project, financed by the EU's 7th Framework program, looking into the wider meaning of hunting in the 21st century**



### Mountain nyala in Ethiopia

The quality and quantity of information (e.g. monitoring) determines the ability to make informed decisions. Our case study on mountain nyala, an ungulate endemic to Ethiopia, showed that the 10 years of monitoring data currently available is sufficient to make informed decisions, but that the system is currently hampered by large uncertainties in the precision of monitoring and the unknown rate of population loss (e.g. poaching or habitat loss).

### Bushmeat in Tanzania

In the case study on monitoring impala and wildebeest in the Serengeti, the spatial distribution (clumped vs. even) and the monitoring effort have been shown to interact to determine the bias and precision of the monitoring data. This approach is crucial when developing long term monitoring plans to manage wildlife. The extent of bushmeat hunting in Tanzania is largely uncertain. We used indirect questioning techniques to allow anonymity of the respondent. Among a range of techniques, the unmatched count technique was selected for clarity and ease of use above the 2-card, the randomized response and the ballot box technique after a pilot study. The estimated percentage of households engaged in bushmeat hunting was around 19% in the dry season and 13% in the wet season.

### Additional work – lion hunting

African lions have decreased over the last decade across Africa despite theory predicting that age limited trophy hunting could be sustainable. We developed a new model for sustainable trophy hunting that includes harvest rule that sets the maximum searching time until a kill and that is robust to a large range of uncertainties. This model that uses data that would be readily available for a range of trophy hunted species (time spent before an animal is killed) to develop simple yet robust rules for sustainable harvesting. Thus, this approach should be widely applicable.

### Read more in:

Kinahan A, Bunnefeld N. (in press, pre-print abstract online) Effectiveness and cost efficiency of monitoring mountain nyala in the Bale Mountains National Park, Ethiopia. *Endangered Species Research*, doi: 10.3354/esr00438, <http://www.int-res.com/prepress/n00438.html>

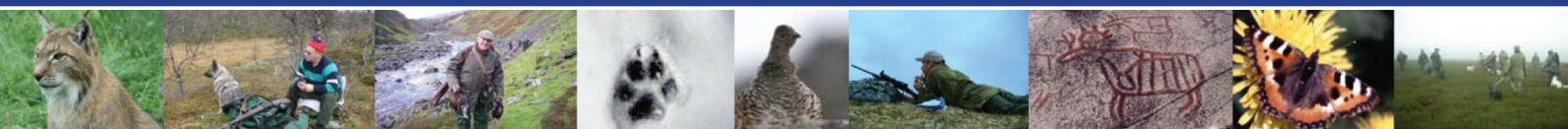
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<http://fp7hunt.net>

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Ghoddousi, A. (2010) Movement ecology of GPS-collared Brown bears in Croatia and Slovenia (with Dr K. Jerina, University of Ljubljana & Prof D. Huber, University of Zagreb), <http://www.iccs.org.uk/wp-content/thesis/consci/2010/Ghoddousi.pdf>

Marino, A. (2010) Public attitudes toward the brown bear in Croatia: a change over time. (with A. Majic, University of Ljubljana), <http://www.iccs.org.uk/wp-content/thesis/consci/2010/Marino.pdf>

Swan, G. (2011), Spatial variation in Common Buzzard (*Buteo buteo*) abundance and diet in relation to habitat type and prey abundance (with Prof Steve Redpath, University of Aberdeen), <http://www.iccs.org.uk/wp-content/thesis/consci/2011/Swan.pdf>

Daniel, B. (2010) Effects of sporting estate management practices on biodiversity in Scotland (with Dr R. Bryce & Prof S. Redpath, University of Aberdeen), <http://www.iccs.org.uk/wp-content/thesis/consci/2010/Bronwen.pdf>

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